



Heuristic approach to Non-preemptive Open Shop Scheduling to Minimize Number of Late Jobs n_T

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Abstract: This paper considers how to sequence n jobs through m resources, with all jobs initially available for sequencing through any of the resources, all commenced jobs are committed to completion at a deterministic time with the engaged resource (non-preemption), and with no prescribed sequence of operations through the m resources (Open Shop). Minimizing number of late jobs for the Open Shop has been shown to be NP-hard (Pinedo, 2008) due to the Open shop's relaxed structure in contrast with the Job Shop, where jobs have a prescribed order of resource processing. The development of heuristic procedures that undercut the computational extensiveness of complete implicit enumeration is therefore befitting. Many practical applications for this scheduling model exist especially in testing and maintenance in which the order in which jobs can be processed makes no difference. Teacher-class time-tabling is also another open shop problem instance: teachers have to be assigned to classes but cannot be scheduled to two classes at the same time, but should teach the assigned classes in any order for the day. The paper presents an $O(mn)$ procedure that should generate schedules quite quickly and can approximate optimal sequences. Small cases numerical examples demonstrates the heuristic procedure and results obtained by complete enumeration. Finally, the heuristic procedure can be shown to require simpler computational steps compared to those presented by Blazewicz et al (2003), and would be conducive for non-computer-based human computing.

Key Words: Open Shop; Non-preemptive Scheduling; Number of tardy jobs; Late jobs; Heuristic